Dr. Jill

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152: Dr. Jill interviews Ari Whitten: How to Overcome Fatigue for Good and Reclaim Your Energy

Dr. Jill 0:13

Well, hello everybody, and welcome to another episode of Dr. Jill Live. Today I have my friend and colleague Ari Whitten, who's an expert on mitochondria and energy. I will introduce him in just a minute.

Dr. Jill 0:26

But as you well know, you can find my podcast on YouTube, Stitch, iTunes—anywhere you listen to podcasts. Wherever you're listening today, would you please stop by and leave a review? Or if you're on YouTube, hit 'Subscribe' so you can get notifications of any upcoming episodes. We really appreciate your support. And if you have looked for other episodes, you can find all of them wherever you have heard this one.

Dr. Jill 0:47

All right. So without further ado, I'm going to introduce my friend Ari. Ari Whitten, M.S. is the founder of the Energy Blueprint. He's the best-selling author of *The Ultimate Guide to Red Light Therapy* and *Eat for Energy*: *How to Beat Fatigue and Supercharge Your Mitochondria for All-Day Energy*. Who of us can't use that, right? He has a Bachelor of Science in Kinesiology and certifications from the National Academy of Sports Medicine as a Corrective Exercise Specialist and Performance Enhancement Specialist. He has completed extensive graduate training in clinical psychology and holds a Master of Science degree in Human Nutrition and Functional Medicine. Ari is tirelessly researching and has obsessively devoted the last 27 years of his life to the pursuit of being on the cutting edge of science on health and human energy optimization. You can find his podcast, programs, and supplement formulas at www.theenergyblueprint.com. Ari, thanks for coming on the show.

Ari Whitten 1:45

Thank you so much for having me. It's a pleasure to connect with you again.

Dr. Jill 1:48

You're welcome. So I love story. Why we do what we do is really the driver, right? So I'd love to hear your backstory. You've got all this degree and study, and I love that you've really narrowed into the focus. But tell us how you got to where you're at now.

Ari Whitten 2:02

Yes. Well, as my bio alludes to, my original background was in fitness, athletic performance, bodybuilding, and body composition. That was my world since I was 12 years old. I'm going to turn 40 this year, so I'm going on almost three decades now of studying health science, very, very, very passionately and without really stopping. Since I was a little kid, this is my area of passion.

Ari Whitten 2:34

There are a lot of people, especially physicians, who I think come into this... And their whole background is very abstract, very conceptual, and very academic. Like, you're learning about health in a classroom where you're getting lectured about topics. And my background: Before I was ever lectured in a classroom, I had almost a decade of real-world practical experience.

Ari Whitten 3:04

The original biohackers were bodybuilders. Long before biohacking was a term, decades before, bodybuilders were doing all kinds of wacky, extreme stuff: Injecting themselves with all kinds of chemicals in the pursuit of more muscle and less fat, and subjecting themselves to all kinds of extreme things. So I grew up in that world, fortunately, never injecting myself with anything. But that was the culture I was brought up in. My older brother, from the time I was very young, was a bodybuilder and a personal trainer, being mentored by a professional bodybuilder who was into that whole world of steroids and chemical enhancement. I was also an athlete, a martial artist, and a soccer player growing up. So I had a decade of knowledge by the time I was 22 years old.

Ari Whitten 3:59

Coming out of college, I already had so much experience with the human body—the practical, experiential aspect of how the human body works. [I was] experimenting, running my own experiments of: How does my body respond to this? What happens if I do this? And what are the side effects of doing too much of this? It is invaluable to have that kind of base or foundation of experience, knowing how to run experiments on the human body and how it responds.

Ari Whitten 4:30

I did a bachelor's in kinesiology, which is movement science, [with] a lot of emphasis on exercise physiology, biomechanics, nutrition, and things of that nature. I was a personal trainer and nutritionist for many years. I went to medical school for two years and despised it in large part because I had such a strong background in nutrition, fitness, and health science as opposed to sickness science like pathology. I understood how to create health, and it was very bizarre to me to be going through medical school and not being taught anything about how to be healthy, just being taught about pathology and understanding diseases. And "This disease requires this drug."

Ari Whitten 5:21

The paradigm just seemed very sick to me to be in the hospital and see type 2 diabetics on 12 different prescription drugs being served a terrible diet and being taught nothing about nutrition. I was the only one there who perceived this as insane. And because I perceived it as insane, the other students in the class were looking at me. If I dared to say anything or to question anything that was going on, it was like: "Oh, he thinks he's so smart. He thinks he knows better." So then I was receiving all this judgment for questioning what was going on there. It was ultimately a very toxic environment for me. I chose to leave, which was a very hard decision.

Ari Whitten 6:07

I went on to do a Ph.D. program in clinical psychology. I completed all three years of coursework for that and then decided I didn't want to be a clinical psychologist. So I didn't do the years of internship, but I completed all the coursework for it. Then, in my mid-20s, I got the Epstein-Barr virus, and I got mononucleosis very severely. I was left with chronic fatigue for about a year after that. This was a very serious transition for me as someone who had always been fit, always been super healthy and energetic, and really [at] the pinnacle of fitness and health my whole life since I was young. All of a sudden, I was without energy. I could tell you about the specific reasons why that happened. But the short of it is [that I was] over-exercising, sleeping in a mold-rich room, and sleeping only four hours a night due to, kind of, a party lifestyle at that time in my life.

Ari Whitten 7:11

Then, basically, I went to see conventional doctors. Initially, they misdiagnosed me as having strep throat and gave me penicillin, which only made me worse. Then,

when it was discovered that I had the Epstein-Barr virus and mononucleosis, they didn't have anything to offer. When I went to see conventional doctors with chronic fatigue, they had nothing to offer. And when I went to see alternative practitioners and functional medicine doctors with chronic fatigue, for the most part, I was the adrenal fatigue story.

Ari Whitten 7:43

Something very interesting came out of that. I started to go deep. Because I was scientifically literate and had a strong background in health science, I started to do so much reading on my own about adrenal fatigue. I discovered at some point that within conventional medicine, they brush off the whole concept of adrenal fatigue as pseudoscience. It's not seen as a legitimate medical condition. This is where the story kind of becomes a bit ironic. But basically, at the time, I was annoyed that conventional medicine brushed off the concept of adrenal fatigue because I was convinced that I had adrenal fatigue. These people that I respected had diagnosed me with adrenal fatigue. Because I was annoyed at conventional medicine and their reaction to it, I basically said, "I'm going to write a book that goes methodically and systematically through the science to prove that adrenal fatigue is in fact a real thing."

Ari Whitten 8:47

That's when something very interesting happened. When I started to delve into the scientific literature on it, I discovered there really isn't any scientific literature on adrenal fatigue. It ended up being like a year of my life that I dedicated to this topic in particular. I basically gave myself a Ph.D. in the science of the relationship of cortisol and adrenal function; HPA axis function and the relationship to chronic stress and chronic fatigue.

Ari Whitten 9:16

But I started to discover: "Okay, well, there's nothing on adrenal fatigue. How do I look this up?" So then I started putting in: "Chronic fatigue and cortisol," and I'd come up with some studies. "Chronic fatigue syndrome and cortisol," "Stress-related exhaustion disorder and cortisol," and "adrenal function." "HPA axis function"—there are some studies there. "Burnout syndrome" is a legitimate, recognized condition. "Clinical burnout" is another name of a similar one. And "cortisol and adrenal function." So I started coming up with these studies.

Ari Whitten 9:54

At first, I'm like: "Yes, I hit the jackpot! Now I have the scientific basis to prove adrenal fatigue is a real thing!" Then I started basically seeing studies that... The gist of these studies, science 101, is that essentially you take a group of people that have adrenal fatigue-type symptoms [such as] difficulty sleeping, low energy levels—yada, yada, yada—stress-related fatigue, exhaustion, and burnout-type symptoms. You then take a similar group of people matched for age and gender and all the different demographics—smoking, exercise habits, etc.—and you see if the group with those symptoms has abnormal adrenal function or abnormal cortisol levels. It's a very simple scientific framework and experimentation model that would allow you to validate the theory of adrenal fatigue.

Ari Whitten 10:53

It turns out there are many, many dozens of those kinds of studies that have been done over the last three decades. And I found them, and I found them all. I literally mean that I spent a year of my life digging up every study in existence on that topic. And when I started to dig through them, basically what I found were all kinds of studies that didn't support my bias or the beliefs that I had going into it, meaning I found lots of studies that showed that the group with those symptoms had perfectly normal adrenal function and cortisol levels that were indistinguishable from [those of] healthy, normal people without those symptoms.

Ari Whitten 11:35

And if you want me to summarize the body of literature as a whole: 59 individual studies over three decades, basically since the 1990s. Of those, 15 supported a link between slightly lower cortisol levels on average in the group with fatigue. Eleven of them supported the opposite finding—slightly higher cortisol levels. And 33 of them showed no discernible difference whatsoever. So the majority of those studies, as I said, find no difference in cortisol or adrenal function. At that point, I was like: "First of all, conventional medicine is right in their judgment of the scientific basis of adrenal fatigue. And they're correct in their determination of that." But at that point, I was like, "Okay, well, what the heck's causing my fatigue?" What is the real science of human energy regulation?

Dr. Jill 12:36

And I'm curious: Did you test your cortisol levels in there? Were they high, low, or normal?

Ari Whitten 12:42

I did. They were normal. This is partly what prompted it; they were normal. What happened was that the practitioner that I was seeing still diagnosed me as having adrenal fatigue. And this is another bizarre element of the whole adrenal fatigue thing: Essentially, whether you're high, low, or normal, regardless of what the results of your cortisol test are, they will say you're in one phase or another of adrenal fatigue. And I'm like, "This is actually not very scientific at all." Where else, in any condition, do we essentially say, "Regardless of whatever your test results are—high, low, or normal—you still have the condition"? That in itself is a big red flag.

Dr. Jill 13:22

And I want to clarify real quick. This is brilliant. I want to just let you go on and on. But I want to clarify for our listeners because, 20 years ago, when I started functional medicine, I was one of those who talked about adrenal fatigue. And I went back, just like you, and looked at the research. It does not support it. And I changed everything I wrote to HPA axis dysfunction. I just want to make sure we're on the same page. There is such a thing as HPA axis dysfunction, correct?

Ari Whitten 13:51

Correct.

Dr. Jill 13:51

You would agree with that. And there's also such a thing as a true Addisonian crisis, or Addison's [disease], where people literally do not produce cortisol or have such a diminished thing that they could die without supplemental [help]. I want to clarify for our listeners because they've heard me talk a lot about this. And I love your view because I did the same thing. I looked at the research and said, "I can't use this term anymore because it's false." And out there, there's a lot, a lot of false information. So I really like that you're bringing this to light, but I want to clarify for the audience: There still is HPA axis dysfunction. You can still have low cortisol. That makes you feel like crap. But the terminology really matters because there really isn't the science to support that—adrenal fatigue.

Ari Whitten 14:28

Yes.

Dr. Jill (pre-recording) 14:28

Hey, everybody. I just stopped by to let you know that my new book, *Unexpected: Finding Resilience through Functional Medicine, Science, and Faith*, is now available for order wherever you purchase books. In this book, I share my own journey of overcoming a life-threatening illness and the tools, tips, tricks, hope, and resilience I found along the way. This book includes practical advice for things like cancer and Crohn's disease and other autoimmune conditions, infections like Lyme or Epstein-Barr, and mold- and biotoxin-related illnesses. What I really hope is that as you read this book, you find transformational wisdom for health and healing. If you want to get your own copy, stop by ReadUnexpected.com. There, you can also collect your free bonuses. So grab your copy today and begin your own transformational journey through functional medicine in finding resilience.

Ari Whitten 15:24

Yes. So since you brought up these nuances, maybe we'll dig deeper into this before we go on to the other layers of the story, like mitochondrial health in particular, which is what I think is at the center of energy regulation. First of all, with Addison's [disease], yes, absolutely. Addison's [disease] is a real thing. It's possible to have truly low cortisol levels. It is possible to have a state of physiology where the adrenals truly cannot supply cortisol levels. This is absolutely a condition, and it's virtually entirely unrelated to chronic fatigue or stress-related exhaustion. It's talking about some tiny, tiny subset.

Dr. Jill 16:02

It's really autoimmune or infectious or some... There's usually some trigger that's a very specific trigger where you could have gotten an infection. You could have an autoimmune [disease] or just a failure of the gland. But again, that's a very, very, very different thing. I'm glad you said that, though.

Ari Whitten 16:17

Right. A person can have Addison's disease. But I want to be clear: A huge chunk of the population that has chronic fatigue or stress-related burnout does not have Addison's disease. Let's say 99.99999% of them do not have Addison's disease. For many reasons, we know that. But this is also something that's easily distinguishable from other types of HPA axis dysfunction by measuring another hormone called ACTH. ACTH comes from the brain. It's a hormone produced by the brain to tell the adrenal glands: Produce more cortisol; we need more cortisol. If you've got a situation where you have lots of that hormone but still low cortisol levels, that means the adrenals truly don't have the capacity to produce enough cortisol.

Dr. Jill 17:08

It's called secondary adrenal deficiency. Yes.

Ari Whitten 17:11

So it exists. It's a rare condition called Addison's disease that's unrelated to the chronic fatigue epidemic as a whole. It is also the case—you brought up the distinction with HPA axis dysfunction—yes, HPA axis dysfunction absolutely exists. However, even just going back to the research I just cited, many of those studies actually do a more detailed assessment of CRH and ACTH also built into that to assess for hypothalamic dysfunction or pituitary dysfunction in addition to cortisol abnormalities. Again, cortisol levels and adrenal function are normal in most of these people.

Ari Whitten 18:06

There is a subset of that population, just like there is a subset of the non-chronically fatigued population that does have cortisol abnormalities, low or high cortisol levels, or a disrupted diurnal curve where it's too low in the morning and too high in the evening. These things absolutely exist. HPA axis dysfunction absolutely exists. However, it is not actually that common in people with chronic fatigue. It is not the norm in the majority of people.

Ari Whitten 18:47

Now, since you mentioned this, I also did a very deep dive into the literature on a couple of things; one is chronic stressors of various kinds. So psychological stress could be from relationship stress, financial stress, job stress, physical stress from overtraining in athletes...

Dr. Jill 19:05

Or mold and toxic exposures.

Ari Whitten 19:08

I didn't find any studies on that in cortisol, but...

Dr. Jill 19:12

I have. Chaetomium is a specific mold highly associated with low cortisol levels.

Ari Whitten 19:17

Okay, interesting. So trauma… What else? Various kinds of toxins, cigarette smoking, alcohol consumption—almost every type of stressor that you can think up. Trauma, mold, and certain types of toxin exposure are the only real exceptions to this. But almost without exception, every type of stressor you can come up with, even when it has existed for decades, even metabolic stressors such as disease states, obesity, and diabetes, are not associated with a state of low cortisol as a result of the chronic stress wearing out the adrenal glands. They're associated with higher than normal cortisol.

Dr. Jill 20:04

And I've seen that with mold, too—I just want to clarify. There are more people I see with mold and high cortisol than with low [cortisol]. So I love that.

Ari Whitten 20:14

So almost across the board, every type of stress you look up is associated with higher than normal cortisol, which is—even when these things have been present for decades—exactly the opposite of what the adrenal fatigue hypothesis would predict. What it would predict is that chronic stressors present over decades would exhaust the adrenal glands, resulting in low cortisol. Anywhere you look in any type of chronic stressor, it is almost universally, without exception, associated with higher-than-normal cortisol. Basically, what's happening is that there is no exhaustion of the adrenal glands. The adrenal glands are actually hypertrophying. They're growing to adapt to chronic stress and produce more cortisol. So basically, there are a lot of different ways of saying the theory is wrong.

Ari Whitten 21:00

Now, there is a demographic, a subset, with true HPA axis dysfunction or abnormal aspects of the curve, which often don't even manifest as any symptoms or illness that a person feels. And let me give you the single most powerful disrupter of the HPA axis function. This is something that commonly results in low enough morning cortisol levels that if these people take a salivary cortisol test in the morning and go see a practitioner who believes in adrenal fatigue, they will almost universally come back with a diagnosis of adrenal fatigue. It's very simple. It's being a night-owl chronotype. If you are someone who simply goes to bed late at night, it has been shown in numerous studies that those night-owl chronotypes versus morning types have about half the morning cortisol levels of a morning person. And they don't have any symptoms. I'm talking [about] normal, healthy people without symptoms [who] have half the morning cortisol levels.

Ari Whitten 22:12

I'm assuming that melatonin has some play in it because melatonin will suppress cortisol. So as they have higher melatonin, particularly earlier in the morning, they probably drag on into 8 A.M. or whatever, and then that's going to suppress the cortisol.

Ari Whitten 22:26

Exactly. And they're most likely staying up with lots of artificial lights blaring into their faces late into the hour, so they're suppressing melatonin and having cortisol levels elevated at a later hour. So you get this disrupted diurnal curve effect. Again, even in normal, healthy people, you're just a night owl. You don't have chronic fatigue or adrenal fatigue symptoms. So anyway, those are some aspects of the story. I could talk to you about it for hours, but...

Dr. Jill 22:49

Let's talk mitochondria. That's where I want to go because you are the expert there. I want people to get, like, "Okay, so what is it?"—because I agree with you that the toxins and infectious burden that I see are really affecting mitochondria. And that's where longevity is, too. So tell us about why mitochondria are really more of a root for our energy production.

Ari Whitten 23:06

Yes. Well, at the end of all of this search for me... I was trying to find answers to my own stuff at the end of the day. Then I saw these physicians. I did this whole deep dive into adrenal fatigue. And ultimately, I'm like, "Okay, well, if it's not adrenal fatigue, what the hell is it?" So at that point, I spent another several years doing deep dives into, "Well, I know sleep is related to energy." Obviously, if you don't sleep well, you don't have lots of energy. "What are the mechanisms linking that and circadian rhythm?" So I spent a long time looking at circadian rhythm and the mechanisms there. "And I know exercise is related to that. So what are the mechanisms underlying how exercise relates to energy? And what about psychological stress? How does that relate to energy? And nutrition, of course, is related to energy. What's the story? What's going on physiologically that links nutrition to energy regulation, fatigue, or good energy levels?"

Ari Whitten 24:05

I spent several years going down these rabbit trails of each of these pathways and ultimately arriving at this list of like 150 different mechanisms that were in one way or another related to this energy story—neurotransmitters, hormones, AMPK, and all kinds of stuff. It was a nice list, and I had a lot of different ways to talk about the energy story. But it wasn't until I found Robert Naviaux's work on the cell danger response. He's a researcher, MD, Ph.D., who runs a lab for mitochondrial medicine at the University of California, San Diego. I found his work on the cell danger response, and I was like, "This is it." It gave me a coherent framework to synthesize all this year's worth of information and pathways that I had figured out around energy, synthesize it, and figure out: What is actually regulating this energy in the human body?

Ari Whitten 25:08

If we look at a car, there are lots of parts that are important for that car to drive down the road. The engine block is important. The pistons are important. The crankshaft is important. Gasoline is important. The wheels and tires are important. The axles are important. There are lots of parts that you could say: "If we remove that part, the car doesn't function. It can't drive down the road." But what is actually controlling whether or not the car is driving down the road and how fast it's going is the person in the car with the key who is pushing either the brake or the accelerator and how hard they're pushing the accelerator. So what's regulating it? That's the question. What's the thing controlling it?

Ari Whitten 25:50

And when it comes to human physiology, the evidence really suggests that mitochondria are regulating human energy levels. We're often taught about them as these sort of mindless cellular energy generators: They just take in carbs and fats; they pump out energy in the form of ATP. But where Robert Naviaux's work came in was that it synthesized many decades of research from researchers all over the world looking at mitochondria, finding out all these pieces of the story. "Oh, actually, in addition to energy generators, they're also doing this and they're also doing that. And they're also serving a role in immune health and regulating the redox status of the cell"—all kinds of things.

Ari Whitten 26:36

Basically, the synthesis of all of that was that mitochondria actually have two roles: They have a role as energy generators, and they have a role as environmental sensors. They are constantly asking the questions—I'm anthropomorphizing a little bit—is it safe for us to produce energy? Are we under attack? Is there danger

present? And as environmental sensors, to the extent that they are picking up on danger signals and threats that are surpassing their stress buffering capacity, their energy production capacity, they shift out of energy production mode towards cellular defense mode. So in other words, mitochondria aren't just the thing that produces energy; they are also the thing that senses the environment and decides whether or not to produce energy. So fundamentally, the degree to which your mitochondria are in energy mode or defense mode is what is regulating human energy levels.

Dr. Jill 27:46

I love that. And it's funny because I remember the day I was sitting in my first lecture with Dr. Naviaux and the same thing: My jaw dropped, my mouth opened, and I'm like, "This is it." And I remember my colleagues too. It was just like, "Okay, this is really pulling together so many of the pieces." And of course, I'm an environmental-toxic specialist, so I see how that affects energy levels. I'm like, "Oh my goodness, this makes all the difference." So I love that you found his work and that you've put it all together because I feel the same. We owe so much to his research.

Dr. Jill 28:20

Gosh, I could talk all day. And I'd love to talk about how the HP gets out of the cell and then signals from the outside in of the cell danger response. But maybe we can shift to the practical because people listening are like: "Okay, yes. But tell me how to get well and what to do." I know you wrote a lot about red light. I'm a huge fan. I've got devices all over my room here. Let's talk first about light. Why does light affect mitochondria? And then maybe just some practical tips for people who have fatigue on what they could do to optimize mitochondrial function.

Ari Whitten 28:46

Okay. Let me... Maybe we'll come back to this later. Okay, so red and near-infrared light is a very interesting story. I've written a book on this. I've written the most popular book on the subject.

Dr. Jill 29:01

What's the title? Just go ahead and give that for people—

Ari Whitten 29:04

The Ultimate Guide to Red Light Therapy. There are clinical textbooks written by researchers like Michael Hamlin, a Harvard professor, but they're there for academics and researchers. They're not meant for the general public. I mean, somebody in the general public who buys one will be like: "Why did I buy this? This is horrible." It's just full of—

Dr. Jill 29:23

Wave lengths, right?

Ari Whitten 29:26

Information on like 5,000 studies, but with no practical advice on how to actually use it. So anyway, red and near-infrared light is an amazing aspect of human health, and I think it's a really important and neglected aspect of human health. And there's a new discovery around this just in the last year or two that I think is going to turn out to be really important. The very quick version of this is that we have over 6,000 studies now showing that red and near-infrared light are bioactive in the human body and that light photons interact with the human body to modulate physiological processes.

Ari Whitten 30:10

Just that in itself is kind of an odd concept for people to wrap their heads around because we're used to thinking of [things] like: Light affects plants—chlorophyll and photosynthesis. But we're not so used to thinking of light affecting our physiology. Maybe we know some layers of the story. We know UV light interacts with our skin and creates this hormone called vitamin D, and we know that's important. So we take our vitamin D pill—that in itself is a bit of a problem. And we may also know the circadian rhythm story. We know that blue light entering the eyes feeds back into this part of the brain, the suprachiasmatic nucleus, that has our circadian clock and impacts all these neurotransmitters and hormones that impact sleep and wake cycles, energy, mood, cognitive function, physical performance, and all kinds of processes.

Ari Whitten 31:05

So a lot of people are starting to have some sense of the relationship between light and human health. But now there's another layer to the story, which is that red and near-infrared light actually penetrate beneath our skin, unlike UV light, blue light, and other wavelengths that really stop at the layer of the skin. These penetrate deeply into our bodies, inches into our bodies. And those light photons, it turns out, are not just inert. They actually do something when they penetrate deeply into our

bodies. They interact directly with the mitochondria in our cells throughout our body.

Ari Whitten 31:44

And when they're there, there are a few different aspects of what they're doing. Number one, they're actually interacting with a photoacceptor like a receptor directly in the mitochondria called cytochrome c oxidase. These photons of light hit this photoacceptor and really facilitate energy production by the mitochondria. So photons of light allow your cells to produce energy better. And for a long time, that was thought to be sort of the most important mechanism, but it turns out that it's probably not. The main thing that's going on is something called retrograde signaling. By interacting with the mitochondria and acting as a hormetic stressor, it's creating a slight increase in reactive oxygen species, similar to exercise in that sense. The mitochondria are engaged in a process called retrograde signaling, where they essentially send signals back to the nucleus of the cell and alter gene expression.

Ari Whitten 32:48

Fundamentally, red and near-infrared light alter gene expression in a way that tends to suppress chronic inflammatory signals and up-regulate growth factors—healing factors. The specific factors that are expressed differ depending on the tissues. In the brain, it's nerve growth factor, brain-derived neurotrophic factor. In the muscle, IGF-1—insulin-like growth factor-1—and other muscle growth factors. In the bone, there are different growth factors. In the skin, it up-regulates fibroblasts, collagen, and elastin production. And so on and so forth.

Ari Whitten 33:22

We have 6,000 studies showing that this type of light can do all sorts of amazing things, like increase wound healing, whether it's bone, skin, muscle, or tendon. We have tons of studies showing that it speeds up wound healing. Athletes, for example, with sprained ankles get on the field twice as fast if they use red light to speed up their healing for a few minutes a day compared to the athletes who don't use it. It speeds up the rate of healing profoundly. It has anti-aging effects on the skin. It has fat-loss effects. It has muscle gain and endurance-enhancing effects when paired with exercise. It amplifies the effects of whatever exercise you're doing. It speeds up recovery from exercise, so your tissues actually heal faster.

Ari Whitten 34:15

There are many, many different disease applications as well. It's used to treat oral mucositis, which is a common side effect of chemotherapy drugs. It's used to treat diabetic ulcers to get them to heal and [for] all sorts of disease applications like that. But I would say the ones that people are most commonly interested in are things like skin anti-aging, fat loss, slowing down hair loss, and pairing it with exercise to enhance the effects of exercise and wound healing.

Dr. Jill 34:50

I love that. I was just thinking of four things off the top of my head [that are] really practical examples that I use. I've had a Vielight for years. I said there are many devices, but this one happens to have red lights on the scalp and one that goes up the nose through the cribriform plate. There was research, but there's been a lot more. It would be the thing that, if I wanted to get into a flow state, I'd put on that device for 20 minutes, and boom: I am on. My brain is on! So that's number one. Number two, right over there, I have this red bulb from SaunaSpace that, if my back, knee, or something is hurting—20 minutes. Or sometimes I'll even put it on my face. It's right behind me. This is hilarious because it's all here. This device is red light for the face. It is my favorite.

Dr. Jill 35:26

People ask me all the time, "Dr. Jill, what do you use on your skin?" "Well, I've got some great skin products." But that red light—that is the magic. And then you mentioned the teeth. I'm like: "Oh yes, in my bathroom I might have this device that's red and blue light for the gums and the teeth. And I wear that for 20 minutes every night." I'm doing these things all day long, and it's funny because I know some of the research. You are far more of an expert than me. But I will just say that with my N of 1, which means my experience, every one of them is profound. I'm such a huge fan. I wanted listeners to get practical ways. I use these in my everyday life.

Ari Whitten 35:55

Yes absolutely. You know, it's funny; I have this device right now right next to me, which is the mouth device. And I have various other devices scattered around my house and a big LED panel and stuff.

Dr. Jill 36:08

Me too. I'm like pointing all around me to those devices.

Ari Whitten 36:13

I want to tell you about this new discovery because I think you'll enjoy it and you most likely haven't heard of it. Melatonin is a hormone that people know is obviously associated with sleep. Typically, the story is that melatonin is produced by the pineal gland. Occasionally, people will talk about gut-derived melatonin as well. But some people don't even know it's a hormone. The general population thinks it's just a supplement. Melatonin is a hormone produced by your body and can also be taken as a supplement, interestingly enough. Melatonin has, as it turns out, very profound effects on human physiology. We know, obviously, the sleep story. There's lots of emerging research now on the use of it in large doses exogenously for treatments of cancer, neurological diseases, gut diseases, and all sorts of things. And the research is quite positive on all of that.

Ari Whitten 37:18

But there's a new layer to the story that's interesting that came from a researcher named Russel Reiter just in the last few years. He's a sort of legendary... Melatonin research—he's been doing it for decades and decades. One of the most knowledgeable people in the world—maybe the most—on melatonin. They did some interesting experiments on rodents where they removed the pineal gland. They measured levels of melatonin at the cellular level in mitochondria, and they found something unexpected. They found that melatonin levels were unaltered by the removal of the pineal gland. The mice without a pineal gland still had the same levels of melatonin in their cells, which means there's another source of melatonin beyond the pineal gland.

Ari Whitten 38:10

One of the other layers of knowledge that we now have around melatonin is that melatonin is not just a sleep hormone. It turns out that it is probably the most potent mitochondrial antioxidant in existence. And it doesn't just act as a direct antioxidant, it also interacts with our internal antioxidant defense system—what's called the ARE, the antioxidant response element—glutathione, superoxide, dismutase, catalase, heme, oxygenase. We have these powerful antioxidant systems built into our cells, built into our mitochondria. And melatonin—which we're supposed to produce in large amounts every night before bed and during sleep—is basically designed to protect mitochondria and recharge that internal antioxidant system, which is super important for our resilience and our stress-buffering capacity, our capacity to handle the next day's exposures to various insults and stresses.

Ari Whitten 39:16

That story was interesting. I've been talking about that for years, from the frame of circadian rhythm and wanting to make sure that we produce enough pineal-derived melatonin to bathe our mitochondria every night. But it turns out that story isn't quite accurate. The reason it's not accurate is that we actually now know that melatonin is so important to mitochondria that, millions of years ago, mitochondria evolved the ability to produce their own melatonin supply in each of the trillions of cells in our body. So that's the big new discovery: We have lots of melatonin in our cells.

Ari Whitten 39:59

My bet is that in five or ten years from now, we will discover that melatonin is probably way, way more important in human physiology than we currently realize and that it is a vital molecule in maintaining redox balance, allowing the cell and the mitochondria to maintain the proper balance of oxidants and antioxidants. And here's the big new discovery: The main thing that stimulates the production of what's called extrapineal melatonin or mitochondrial-derived melatonin is red and near-infrared light.

Ari Whitten 40:37

Where do we get red and near-infrared light from an evolutionary perspective? Why would this be the case? Sunlight. Basically, humans evolved to spend time each day getting the sun on their bodies. And we know from lots of other lines of evidence that regular sun exposure greatly reduces all-cause mortality. That sun avoidance—there's a big study of 30,000 women in Sweden where they found that the women with the lowest sun exposure had an increased risk of all-cause mortality dying from any cause that was on par with smoking a pack of cigarettes each day. My hypothesis is that regular sun exposure is extremely important to human health. And I think that a big part of the reason why is not just the vitamin D story, as most people think; I think it's actually the red and near-infrared light melatonin story.

Dr. Jill 41:33

Wow. I love this. Gosh, this is so packed with great information and new research. Now, one question I get a lot from patients, and I'm sure you've done some of the research. I'd be curious to know if you have any answer for us. There was some literature out there that said taking melatonin will suppress your own. You shouldn't do it, especially for children. I disagree with that. I feel like it's powerful, and I have not seen that effect. But what's your comment? Could taking it long-term be harmful?

Ari Whitten 41:59

It's a super interesting and controversial area. There's everything from people warning very strongly against even relatively low-dose use. I've read books like Michael Schallenberger's on chronic fatigue. He's recommending, and I don't want to get this wrong and misrepresent this, but I want to say at least 100 milligrams, if not more, to everybody. What's thought to be produced by the pineal gland each night is 0.3 milligrams—300 micrograms. A common supplement dose is 3 milligrams, 5 milligrams, or 10 milligrams. So this is already 10, 20, or 50 orders of magnitude greater than the physiological dose from the pineal gland level.

Ari Whitten 42:58

So you asked about the negative biofeedback loops. It's common in various kinds of hormones. The classic example is men using exogenous testosterone—steroids. What happens is a negative feedback loop where your body starts producing less of its own supply if you provide more exogenously. So the testes shrink and start producing lower testosterone if you start injecting exogenously. And that happens with lots of different hormones in the body. The studies that have tested this on melatonin have found that it's not true and that there is no exogenous suppression of the internal production of melatonin. You can take it externally. It doesn't suppress your own internal supply.

Ari Whitten 43:38

However, anecdotally, a lot of people report that when they use melatonin for a period of time and then go off of it, they don't sleep well for several days, which kind of matches up with what you would expect to find if there were a negative feedback loop present. But speaking purely on the research that has tested it, there isn't a negative feedback loop. I will also say that a subset of the population—and I'm one of them, interestingly enough, and my dad is too, so I think there's a genetic component to this—a subset of people seem to be hypersensitive to exogenous melatonin.

Dr. Jill 44:16

Yes, I am too. I don't know if this is the exact same sensitivity; I'm the same way. There's a genetic SNP I have that creates more melatonin in the morning hours, which actually creates more hyperglycemia, fasted. So I'll look like a pre-diabetic if I'm not careful, just because of my genetics. I don't know if it's the breakdown of melatonin or just that I produce more. And the same as you, if I take too much, I'm really groggy.

Ari Whitten 44:43

Yes, I get super groggy, and my sleep is very disturbed.

Dr. Jill 44:46

Yes, me too. I like that you're saying that, because again, there's this amazing research and amazing power, but all of these things really have to be individualized to the person because we all have genetics and the environment. But the bottom line: Red light therapy, infrared, powerful stuff. I love that.

Ari Whitten 45:01

Yes. And just wrapping that all together, my personal conclusion is that since I'm sensitive and have negative reactions to exogenous melatonin, it makes more sense to do the things that ramp up my own internal supply at the mitochondrial level. So, doing red and near-infrared light therapy. And actually, that enhances my sleep instead of making me sleep poorly.

Dr. Jill 45:28

Oh, I love that because, again, intuitively, I think that's why I've gravitated towards that because I don't really take a lot of melatonin. But I found with the red light the same thing, my sleep is amazing.

Ari Whitten 45:36

And one little layer I'll add to this: I see human health very much through the context of evolutionary biology and through an ancestral lens, so I always put things to that test of logic and thinking. So, does it make sense from an ancestral perspective that I should be supplying 100 milligrams of exogenous melatonin every night? Probably not. Our ancestors didn't really do that. Does it make sense that our ancestors maybe got some red and near-infrared light exposure each night? Oh, they used to sit around a firelight. Hmm. Maybe there's something to that. Maybe they got a lot of sun each day. Maybe there's something to that story. So from an evolutionary biology lens, one of those two things makes a lot of sense. The other doesn't. I'm not saying it's wrong or bad because, especially in the context of disease models, there's lots of very positive research. But I think that's a useful model to subject things to a sort of logic test too.

Dr. Jill 46:36

Yes. Oh, Ari, you are a wealth of knowledge. This has been so much fun, and I could talk to you for hours. What I'm really excited about is the fact that mitochondria... I mean, we're seeing infection, toxin—all of the stuff that I do. It is really a core. And I love that you talk about the cell danger response, too, and the power of infrared. Where can people find you if they want more information? Where can they get your books?

Ari Whitten 46:57

Yes. Books are on Amazon. The best place to follow my work is theenergyblueprint.com.

Dr. Jill 36:13

Perfect. Thank you so much for your wealth of knowledge today—fascinating information—and we'll have to do this again to finish up the talk on: What else is new with mitochondria?

Ari Whitten 47:13

I would love to. Thanks so much for having me.

Dr. Jill 47:15

You're welcome.